Lightweight and Affordable Solar Array System for NASA Solar Electric Propulsion Science Missions, Phase I

Completed Technology Project (2018 - 2019)

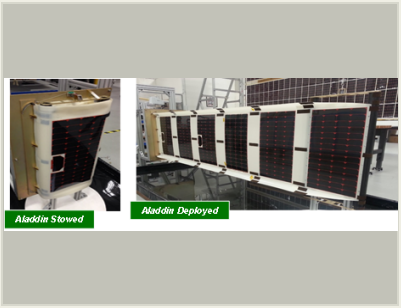
Project Introduction

Deployable Space Systems, Inc. (DSS) has developed a high performance solar array system that has game-changing performance metrics in terms of ultra-compact stowage volume, affordability, high specific power and lowest cost available for a solar array of its size. The proposed solar array system is a foldable composite panel solar array designed specifically for scale-up / high-power SEP applications and is targeted as a direct replacement for existing rigid panel solar arrays. The foldable panel array eliminates the costly honeycomb panels and hinge mechanisms associated with rigid panel array systems, providing a significant system level cost reduction. The innovative solar array consists of a highly-manufacturable single-piece thin laminated panel with solar cells bonded directly to the panel using standard cell laydown processes. The solar array folds upon itself for stowage in a flat-package configuration and is protected for launch with a proprietary packaging technique. Deployment is reliably achieved through a proprietary deployment approach that sequences and coordinates the deployment of each panel. When fully deployed the solar array conforms to an integrated flat planar surface (onto which the PV is mounted) with deep-sectioned cylindrical-shaped out-of-plane longitudinal edges and stiffeners that provide high stiffness/strength.

Anticipated Benefits

NASA space applications are comprised of practically all Exploration, Space Science, Earth Science, Planetary Surface, and other missions that require affordable high-efficiency photovoltaic power production through of an ultra-lightweight, ultra-compact stowage, and highly-modular solar array. The technology is particularly suited for advanced spacecraft that require high power / high voltage solar array arrays that require game-changing ultra-affordability for SEP missions.

Non-NASA space applications are comprised of practically all missions that require affordable high-efficiency photovoltaic power production through deployment of an ultra-lightweight, ultra-compact stowage, and highly-modular solar array. Potential non-NASA commercial and DoD applications span a broad range of high voltage/power applications that demand ultra-affordability. The technology is suitable for non-NASA LEO, MEO & GEO missions.



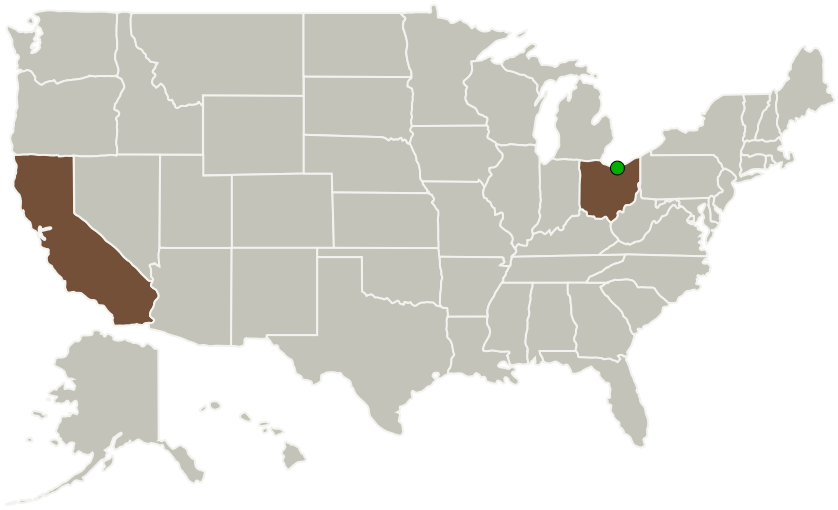
Lightweight and Affordable Solar Array System for NASA Solar Electric Propulsion Science Missions, Phase I

Table of Contents

Lightweight and Affordable Solar Array System for NASA Solar Electric Propulsion Science Missions, Phase I

Completed Technology Project (2018 - 2019)

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Deployable Space Systems, Inc(DSS)	Lead Organization	Industry	Goleta, California
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
California	Ohio

Project Transitions

July 2018: Project Start

February 2019: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137850)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Deployable Space Systems, Inc (DSS)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

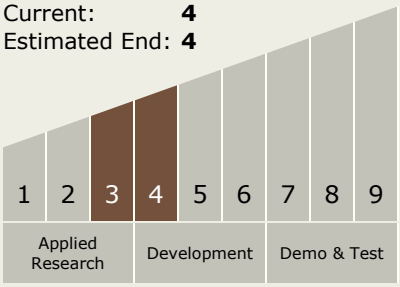
Carlos Torrez

Principal Investigator:

Brian R Spence

Technology Maturity (TRL)

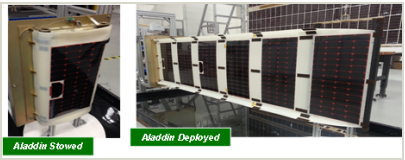
Start: **3**
Current: **4**
Estimated End: **4**



Lightweight and Affordable Solar Array System for NASA Solar Electric Propulsion Science Missions, Phase I

Completed Technology Project (2018 - 2019)

Images



Briefing Chart Image
Lightweight and Affordable Solar Array System for NASA Solar Electric Propulsion Science Missions, Phase I
(https://techport.nasa.gov/image/134144)

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.1 Photovoltaic

Target Destinations

Earth, The Moon, Mars